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SMITHSONIAN
LIBRARY







THE
SMITHSONIAN
INSTITUTION
AND
NATIONAL MUSEUM.



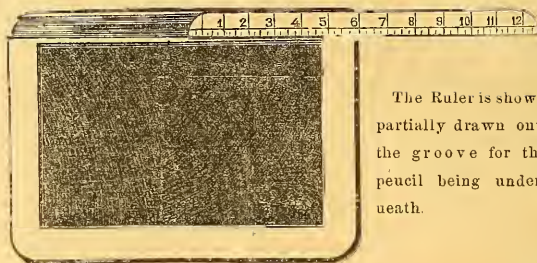
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WASHINGTON, D. C.
1869.

THE RHEES RULER AND PENCIL CASE SLATE

COMBINES UTILITY, ECONOMY, CONVENIENCE, AND INSTRUCTION.

RECOMMENDED BY
Messes. PHILBRICK, KIDDLE,
SHIPPEN, HART, BARNARD,
HENRY, &c. &c.



The Ruler is shown
partially drawn out,
the groove for the
pencil being under-
neath.

Invented by
W. J. RHEES,
Chief Clerk of the
SMITHSONIAN INSTITUTION,
and
Trustee Public Schools.

Adopted unanimously by the School Board of Washington, D. C., every member and the Mayor of the city being present.

WASHINGTON, Feb. 9, 1869.

The Committee on Text-books have examined "Rhees' Patent Slate," and they find it a decided improvement upon the Slates in general use, in the following respects: It furnishes, 1st, a very convenient place for the safe-keeping of the pencil; 2d, an excellent ruler; 3d, the scale of linear measure, accurately and neatly marked in inches and their subdivisions upon this ruler. The cost of this slate is but a trifle more than that of the ordinary slate now in use. The Committee, therefore, take pleasure in proposing to the Board, for adoption, the following resolution: *Resolved*, That "Rhees' Patent Slate" be recommended for use in all our public schools.

J. O. WILSON,	N. A. WEST,	} Committee
G. F. McLELLAN,	WM. J. MURTAGH,	

on Text-books.

For Sale at all Bookstores, or wholesale by E. H. FOSDICK & CO., 35 Dey St., New York.

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AN ACCOUNT

OF

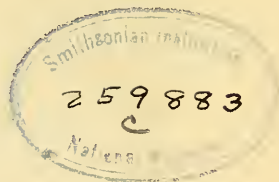
The Smithsonian Institution,

ITS

FOUNDER, BUILDING, OPERATIONS, ETC.,

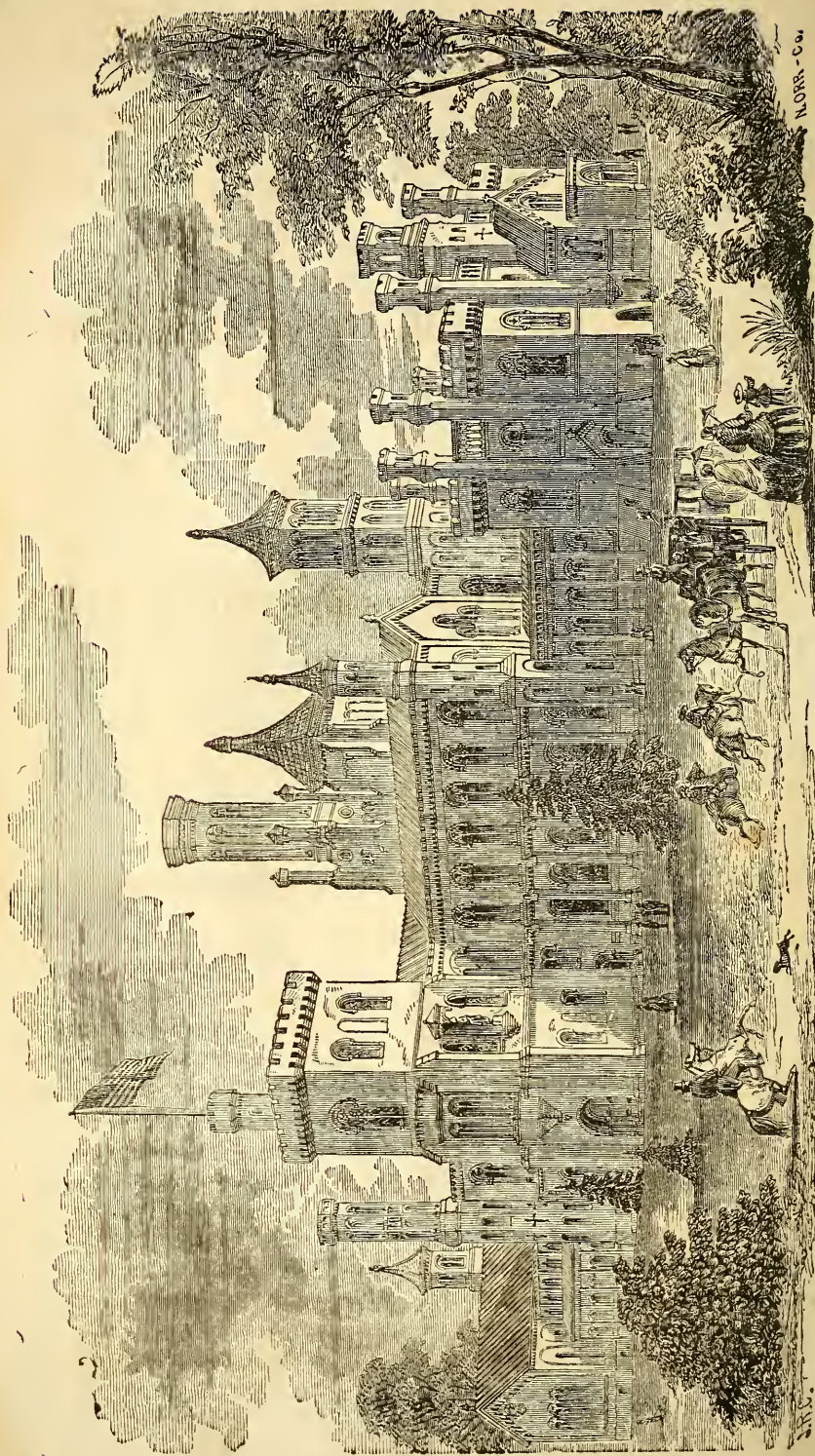
PREPARED FROM THE

REPORTS OF PROF. HENRY TO THE REGENTS, AND OTHER AUTHENTIC SOURCES.



PHILADELPHIA:
COLLINS, PRINTER,
705 JAYNE STREET.

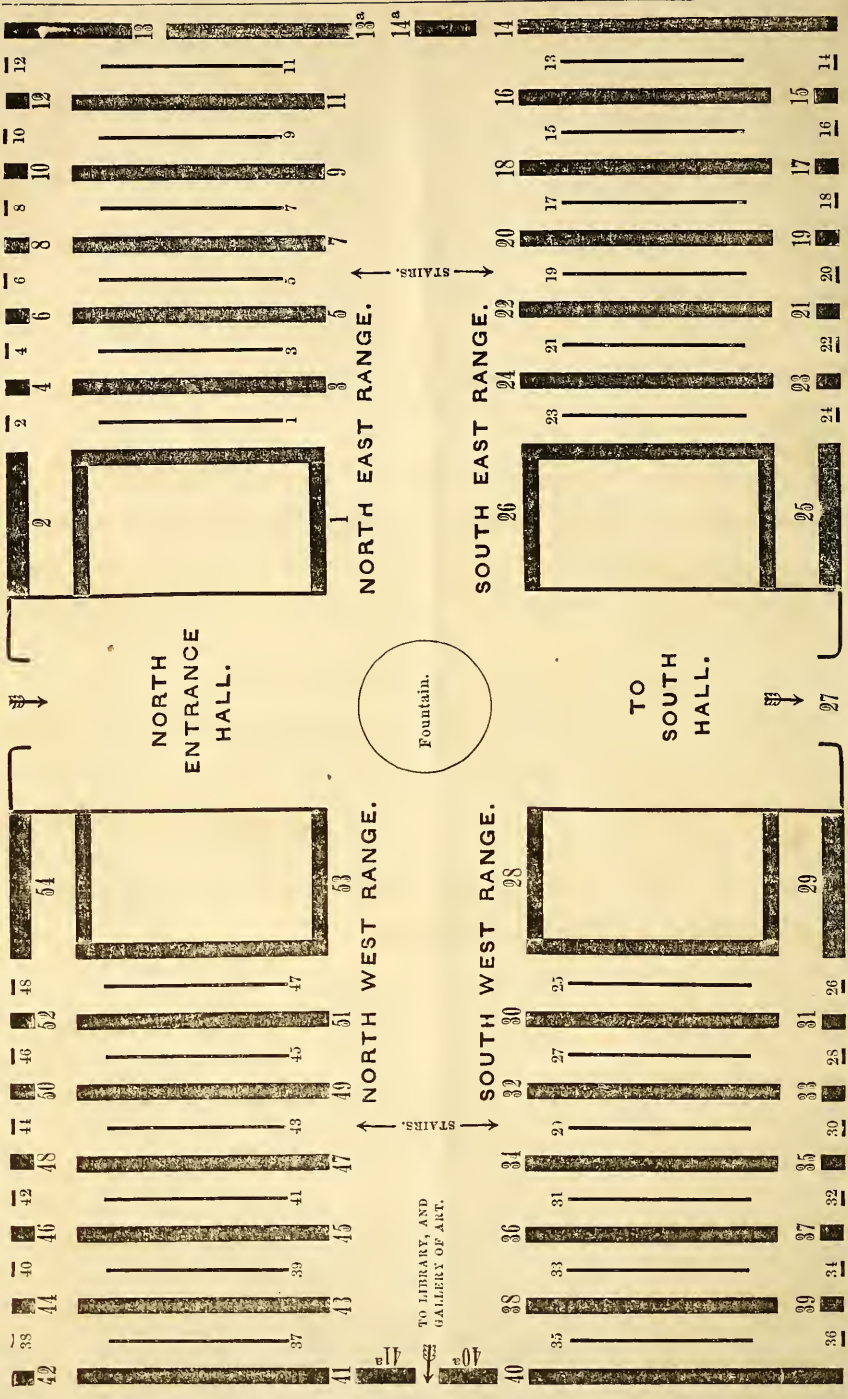
1869



INTRODUCTION.

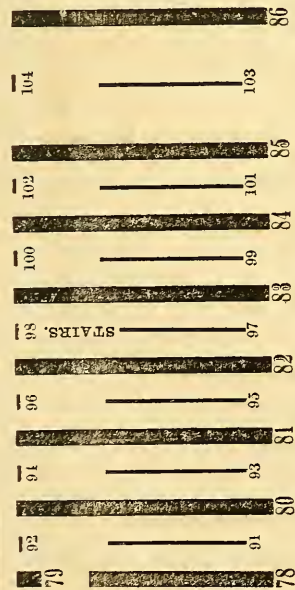
The Smithsonian Institution has attained a world-wide reputation, and its influence and importance are constantly extending. Its publications are found not only in the public libraries of our own land, but also in those of every other civilized country. Its correspondents include some of the most distinguished cultivators of science of the present day, and it is referred to as a center of information by those who are interested in the pursuit of knowledge.

Many persons, however, who visit Washington, are but imperfectly acquainted with the history of Smithson, the great object he had in view, the plans adopted to carry out his intentions, and the results already obtained. It is for the purpose of furnishing more definite information on these points that this work has been compiled, from the annual reports of the Secretary, Professor HENRY, to the Board of Regents, and other authentic sources.



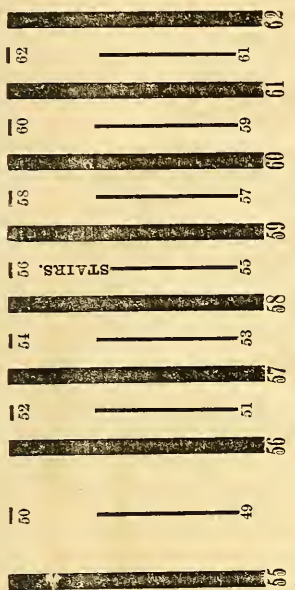
MUSEUM OF THE SMITHSONIAN INSTITUTION.

NORTH.



NORTH WEST GALLERY.

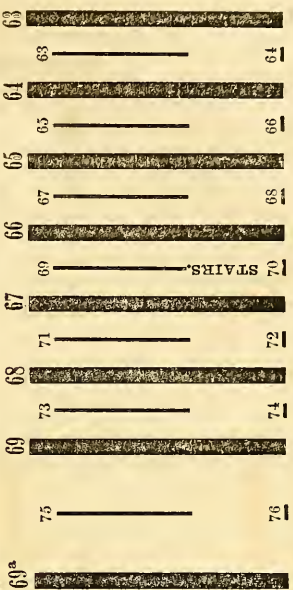
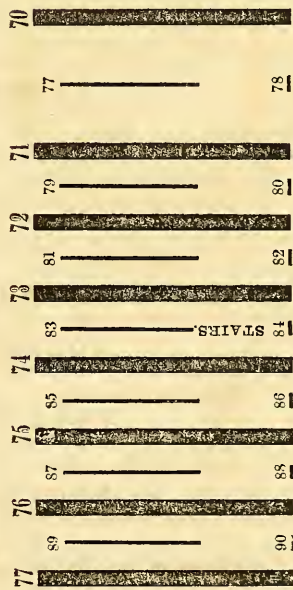
NORTH EAST GALLERY.



EAST.

SOUTH WEST GALLERY.

SOUTH EAST GALLERY.



SOUTH.

EXPLANATION OF DIAGRAMS OF MUSEUM HALLS.

The heavy black lines denote upright Cases, and are numbered from 1 to 86. The light lines are for Table and Window Cases, and are numbered from 1 to 104.

NORTHEAST RANGE.

Principally Mammals, Foreign Birds, and North American Fishes.

CASE 1. Foxes, Wolves, Jaguars, Wild Cats, Panthers, Ant-eaters, Earth-hogs, Peccaries.

CASES 2, 4, 6, 8, 10, 12, 13. Fishes.

CASE 3. Doves, Pigeons, Quails, Partridges, Wild Cocks, Pheasants, Peacocks, Lyre Birds, Grouse.

" 5. Goldfinches, Yellow-birds, Crossbills, Starlings, Cassicans, Satin-birds, Jays, Black-birds Tanagers, Shrikes, Wrens, Manakins, Sparrows, Magpies, Buntings.

" 7. Kingfishers, Swallows, Humming Birds, Birds of Paradise.

" 9. Parrots, Paroquets, Lories, Cockatoos, Barbets, Cuckoos, Woodpeckers, Flickers, Trogons.

" 11. Hawks, Harriers, Kites, Falcons, Eagles, Horn-bills, Peacock Trogons, Owls.

" 13a. Condors, Vultures, Carrion Crows.

SOUTHEAST RANGE.

North American Birds and Reptiles and some Marine Animals.

CASES 14, 15, 17, 19. Serpents in alcohol.

CASE 14a. Eagles, Fish Hawks.

CASE 16. Hawks, Owls, Kites, Buzzards, Vultures.

" 18. Woodpeckers, Flycatchers, Pewees, Kingbirds, Flickers, Thrushes, Warblers, Swallows, Wrens, Buntings, Finches, Nuthatches, Titmice, Robins, Grosbeaks, Snow-birds.

" 20. Blackbirds, Grackles, Jays, Ravens, Orioles, Partridges, Grouse, Sage Cocks, Sandpipers, Rails, Snipe, Marsh-hens, Quails, Knots. CASE 21. Lizards.

" 22. Ducks, Teals, Nest and egg of Eider Duck, Wild Turkeys, Herons, Cranes. CASE 23. Frogs.

" 24. Terns, Gulls, Tropic birds, Man-of-War Bird, Petrels, Cormorants, Loons, Boobies, Gannets, Swans, Pelicans, Brant, Geese. CASE 25. Salamanders and Turtles in alcohol.

" 26. Alligators, Seals, Sea-cows, Albatrosses, Sawfish, Porpoise, Sturgeon, Shark, Gar-fish.

SOUTH HALL.

Sarcophagus, from Beirut, Syria—Plank from Redwood Tree, California—Copper, from Lake Superior Mines—Living Alligator, from Georgia—Idols from Nicaragua.

SOUTHWEST RANGE.

Mammals, Radiates, Crustaceans, Reptiles, Fishes of North Pacific Exploring Expedition.

CASE 28. Bears, Orang Outang, Gorilla, Monkeys, Bighorn, or Mountain Sheep, Wolverines, Otters, Flying Lemurs, Taguans, Fox Phalangiers, Kangaroos, Antelopes.

" 29. Fishes, CASE 31. North American Toads. CASE 33. Star fishes. CASE 35. Shell-fishes.

" 30. Bats, Hedge-hogs, Moles, Sloths, Weasels, Ermines, Sables, Minks, Martens, Raccoons, Ferrets, Hares, Rabbits, Possum Cats, Dasyures, Pagumas.

" 32. Squirrels, Gophers, Mice, Hares, Beaver, Marmots, Rabbits, Porcupines, Moles, Woodchucks, Armadillos, Guinea pigs.

CASES 34, 36, 38. Corals, Sponges, Sea weeds.

CASES 37, 39, 40. Crabs.

NORTHWEST RANGE.

Genera of Fishes, Foreign Birds and Reptiles.

CASES 41, 43, 44, 46, 48. Fishes. CASE 42. Sea eggs and Sea urchins. CASES 48, 50, 52, 54. Reptiles.

CASE 45. Gulls, Noddies, Terns, Penguins, Petrels.

" 47. Tropic birds, Gannets, Pigeons, Albatross, Cormorants, Pelicans, Petrels.

" 49. Geese, Swans, Ducks, Flamingoes, Coots, Rails, Shovellers.

" 51. Ibis, Lapwings, Curlews, Snipes, Cranes, Storks, Bitterns, Herons, Spoonbills.

Between 51 and 53. Dress worn by Dr. Kane and Relics of Sir John Franklin.

CASE 53. Deer, Llama, Reindeer, Elk.

NORTHEAST GALLERY.

CASES 55—62. Collections of Mineralogy, Geology and Palæontology.

SOUTHEAST GALLERY.

CASE 63. Human Skulls.

CASES 64—67. Skulls and Skeletons.

CASE 68. Skins of Reptiles and Fishes.

CASES 69—69a. Botany.

NORTHWEST GALLERY.

Ethnological Collections from East Indies, China, Japan, South America, Africa.

CASES 78—79. Mummies from Egypt and Peru.

SOUTHWEST GALLERY.

Ethnological Collections from the Feejee, Sandwich, Marquesas, New Zealand and other Islands.

TABLE CASES.

CENTRE OF HALL—EAST END. Nests and eggs—The Meteorite—Ores, &c. WEST END. Shells and Turtles.

THE SMITHSONIAN INSTITUTION.



The Founder.

JAMES SMITHSON, the founder of the Institution which bears his name and will perpetuate his memory, was a native of London, England. In his will he states that he was the son of Hugh, first Duke of Northumberland, and Elizabeth, heiress of the Hungerfords, of Audley, and niece of Charles the Proud, Duke of Somerset. He was educated at Oxford, where he took an honorary degree in 1786. He went under the name of James Lewis Macie until a few years after he had left the university, when he took that of Smithson, the

family name of the Northumberlands. He does not appear to have had any fixed home in England, but travelled much on the continent, occasionally staying a year or two in Paris, Berlin, Florence, etc. He died at Genoa, in 1828, at an advanced age. He is said by Sir Davies Gilbert, President of the Royal Society, to have rivalled the most expert chemists in minute analysis; and, as an instance of his skill, it is mentioned that, happening to observe a tear gliding down a lady's cheek, he endeavored to catch it on a crystal vessel; that half of the drop escaped, but having preserved the other half, he submitted it to close analysis, and discovered in it several salts. He contributed a number of valuable papers to the Royal Society, and also to the *Annals of Philosophy*, on chemistry, mineralogy, and geology. His scientific reputation was founded on these branches, though from his writings he appears to have studied and reflected upon almost every department of knowledge. He was of a sensitive, retiring disposition; was never married—appeared ambitious of making a name for himself,

either by his own researches or by founding an institution for the promotion of science. He declared, in writing, that though the best blood of England flowed in his veins, this availed him not, for his name would live in the memory of man when the titles of the Northumberlands and Percies were extinct or forgotten. He was cosmopolitan in his views, and affirmed that the man of science is of no country—the world is his country, and all men his countrymen. He proposed at one time to leave his money to the Royal Society of London, for the promotion of science, but on account of a misunderstanding with the council of the Society he changed his mind, and left it to his nephew, and in case of the death of this relative, to the United States, to found the Institution which now bears his name.

The Bequest.

The original amount received from the bequest was \$515,169; but from a residuary legacy, savings of interest, &c., the fund has been increased to \$650,000 now in the Treasury of the United States and yielding six per cent. interest. The Government of the United States accepted the bequest, or in other words, accepted the office of trustee, and the Hon. Richard Rush, of Pennsylvania, was charged with the duty of prosecuting the claim. He remained in attendance on the English courts until the money was awarded to him. He brought it over in sovereigns, deposited it in the Mint of the United States, where it was recoined into American eagles, thus becoming a part of the currency of the country.

At the time of the passing of the act establishing the Institution, in 1846, the sum of \$242,000 had accrued in interest, and this the Regents were authorized to expend on a building. But, instead of appropriating this sum immediately to this purpose, they put it at interest, and deferred the completion of the building for several years, until over \$100,000 should be accumulated, the income of which might defray the expenses of keeping the building, and the greater portion of the income of the original bequest be devoted to the objects for which it was designed. This policy has been rigidly adhered to, and notwithstanding an expenditure of \$450,000 on the building, the collection of a large library and museum, and the publication of many volumes of original researches, the bequest of Smithson is not only undiminished, but has increased more than a hundred thousand dollars.

The Plan of Organization.

The bequest, in the language of the testator, was “to found at Washington an establishment, under the name of the Smithsonian Institution, for the increase and diffusion of knowledge among men.” According to this, the Government of the United States is merely a trustee. The bequest is *for the benefit of mankind*, and any plan which does not recognize this provision of the will would be illiberal and unjust. The Institution must bear and perpetuate the name of its founder, and hence its operations are kept distinct from those of the General Government, and

all the good which results from the expenditure of the funds is accredited to the name of Smithson.

It will be observed that the object of the bequest is twofold—first, to *increase*, and, second, to *diffuse*, knowledge among men. These two objects are entirely separate and distinct, and to view the case understandingly the one must not be confounded with the other. The first is to enlarge the existing stock of knowledge by the addition of new truths, and the second, to disseminate knowledge thus enlarged among men. This distinction is readily acknowledged by men of science, and in Europe different classes of scientific and other societies are founded upon it. The will makes no restriction in favor of any particular kind of knowledge, and hence all branches are entitled to a share of attention. Smithson was well aware that knowledge should not be viewed as existing in isolated parts, but as a whole, each portion of which throws light on all the others, and that the tendency of all is to improve the human mind, and to give it new sources of power and enjoyment. A prevalent idea, however, in relation to the will is, that the money was intended exclusively for the diffusion of *useful* or immediately practical knowledge among the inhabitants of this country, but it contains nothing from which such an inference can be drawn. All knowledge is useful, and the higher the more important. From the enunciation of a single scientific truth may flow a hundred inventions, and the more abstract the truth the more important the deductions. To effect the greatest good, the organization of the Institution should be such as to produce results which could not be attained by other means, and inasmuch as the bequest is for men in general, all merely local expenditures are inconsistent with the will. These were the views expressed by the Secretary, Professor Henry, and constantly advocated by him. They were not entertained, however, by many, and consequently difficulties have been encountered in carrying them out. A number of literary men thought that a great *library* should be founded at Washington, and all the money expended on it; others considered a *museum* the proper object; and another class thought the income should be devoted to the delivery of *lectures* throughout the country; while still another was of opinion that popular *tracts* should be published and distributed amongst the million. But all these views were advanced without a proper examination of the will, or a due consideration of the smallness of the income. The act of Congress directed the formation of a library, a museum, a gallery of art, lectures, and a building on a liberal scale to accommodate these objects. One clause, however, gave the Regents the power, after the foregoing objects were provided for, to expend the remainder of the income in any way they might think fit for carrying out the design of the testator. The plan they have adopted is to stimulate all persons in this country capable of advancing knowledge by original research to labor in this line; to induce them to send their results to the Institution for examination and publication; and to assist all persons engaged in original investigations, as far as its means will allow; also to institute, at the expense and under the direction of the Institution, particular researches.

The Government.

An act of Congress, dated August 10, 1846, provides "that the President and Vice-President of the United States, the Secretary of State, the Secretary of the Treasury, the Secretary of War, the Secretary of the Navy, the Postmaster General, the Attorney General, the Chief Justice, and the Commissioner of the Patent Office of the United States, and the Mayor of the City of Washington, during the time for which they shall hold their respective offices, and such other persons as they may elect as honorary members, be and they are hereby constituted an 'establishment,' by the name of the 'Smithsonian Institution,' for the increase and diffusion of knowledge among men."

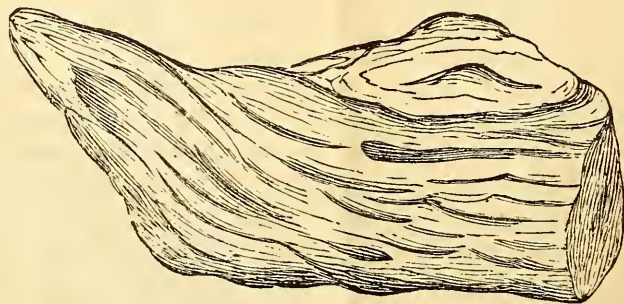
The law also provides for a "Board of Regents," to be composed of the Vice-President of the United States and the Mayor of the City of Washington, during the time for which they shall hold their respective offices, three members of the Senate and three members of the House of Representatives, together with six other persons, other than members of Congress, two of whom shall be members of the National Institute, in the City of Washington, and resident in the said city; and the other four shall be inhabitants of other States, and no two of them from the same State.

The Establishment exercises general supervision over the affairs of the Institution.

The Board of Regents conducts the business of the Institution, and makes annual reports to Congress.

The Secretary of the Institution is elected by the Board. His duty is to take charge of the building and property, discharge the duty of librarian, keeper of the museum, etc., and has power, by consent of the Regents, to employ assistants.

All laws for the protection of public property in Washington apply to the lands, buildings, and other property of the Institution.



METEORITE FROM COAHUILA, MEXICO.

The Structure.

The Smithsonian building stands on a part of a tract of public land denominated "*the Mall*," and the grounds extend from Seventh to Twelfth streets, east and west, and from the canal to B street, north and south, comprising about fifty-two acres. The center of the building is directly opposite Tenth street, and the site is about twenty feet above the average level of Pennsylvania avenue.

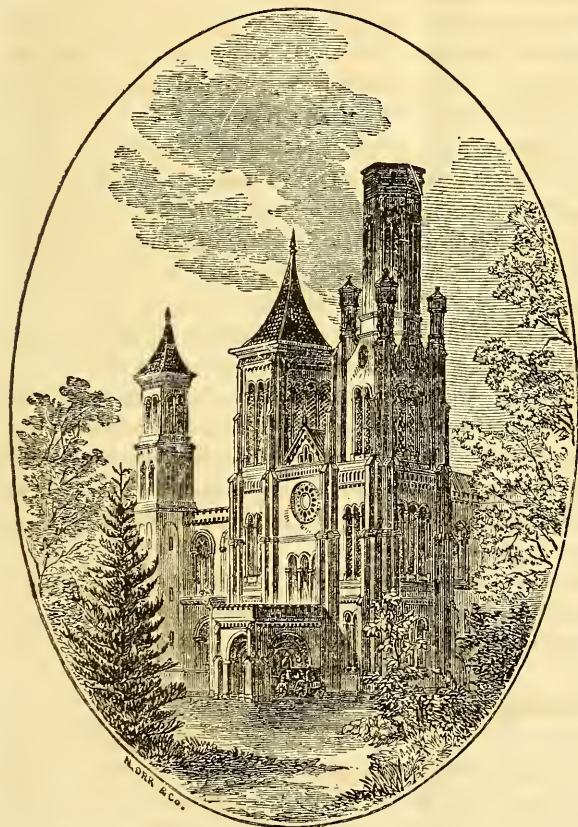
The style of architecture is that of the last half of the twelfth century, the latest variety of the rounded style, as it is found immediately anterior to its merging into the early Gothic, and is known as the Norman, the Lombard, or Romanesque. The semi-circular arch, stilted, is employed throughout—in doors, windows, and other openings.

It is the first edifice in the style of the twelfth century, and of a character not ecclesiastical, ever erected in this country.

The main building has in the center of its north front two towers, of which the higher reaches an elevation of about 150 feet. On the south front is a

massive tower 37 feet square and 91 feet high. On the northeast corner stands a double companion tower, 17 feet square and 117 feet high; at the southwest corner an octagonal tower, in which is a spiral stair case. There are nine towers in all.

The entire length of the building, from east to west, is 447 feet. Its greatest breadth is 160 feet. The east wing is 82 by 52 feet, and 42½ feet high to the top of its battlement; the west wing, including its projecting apsis, is 84 feet by 40, and 38 feet high, and each of the connecting ranges, including its cloister, is 60 feet by 49. The main building is 205 feet by 57, and, to the top of the corbel course, 58 feet high.



NORTH CENTRAL TOWERS.

The building is erected in a very substantial manner. The foundation walls under the main central towers are 12 feet thick at bottom, gradually diminishing to five feet six inches at the surface of the ground, and are sunk eight feet deep. The thickness of the walls of the main building above the water table is two feet and-a-half in the first story, and two feet in the second, exclusive of buttresses, corbel courses, &c. The walls of the wings are two feet thick; of the central towers three feet and a half thick in the first story, diminishing to two feet in the highest story. The roofs are slated. The face of the building is finished in ashlar, laid in courses from 10 to 15 inches in height, and having an average bed of nine inches.

The material employed is a lilac gray variety of freestone, found in the new red sandstone formation where it crosses the Potomac, near the mouth of Seneca Creek, one of its tributaries, and about twenty-three miles above Washington. When first quarried it is comparatively soft, working freely before the chisel and hammer; but by exposure it gradually indurates, and ultimately acquires toughness and consistency, that not only enables it to resist the changes of the atmosphere, but even the most severe mechanical wear and tear.

The corner-stone of the building was laid with Masonic ceremonies, on the first of May, 1847, in the presence of President Polk, his Cabinet, and an immense concourse of citizens and strangers. The Grand Master of Masons, who performed the ceremony, wore the apron presented by the Grand Lodge of France to Washington, through La Fayette, and used the gavel employed by Washington when he laid the first corner-stone of the Capitol of the United States. An oration was delivered by the Hon. George Mifflin Dallas, the first Chancellor of the Smithsonian Institution, and now United States Minister to Great Britain. In the course of his remarks Mr. Dallas said: "When, at no distant day, I trust, it shall be seen that within the walls of this building the truths of nature are forced by persevering researches from their hidden recesses, mingled with the stock already hoarded by genius and industry, and thence profusely scattered, by gratuitous lectures or publications, for the benefit of all—when it shall be seen that here universal science finds food, implements, and a tribune—art her spring to invention, her studio, and her models; and both shall have throngs of disciples from the ranks of our people, emulous for enlightenment, or eager to assist—then the condition of our legacy will have been performed, and the wide philanthropy of Smithson have achieved its aim."

The design, by James Renwick, Jr., of New York, consists of a main center building, two stories high, and two wings, connected by intervening ranges; each of these latter having, on the north or principal front, a cloister, with open stone screen.

The first story of the main building consists of one large room, 200 feet by 50, and 25 feet high, the ceiling of which is supported by two rows of columns extending the whole length; at the middle of the space corresponding to the principal entrances are two wing walls, by which, with the addition of screens, the whole space may be divided into two large rooms, with a hall extending across.

The Library.

Although the act of Congress directed that provision should be made for the accommodation of a library, on a liberal scale, it was soon seen, after the organization of the Institution, that it would be impossible, from the income which could be devoted to it, to establish a first-class general library. Even had this been practicable, it would still have seemed superfluous to do so in the very vicinity of the miscellaneous library of Congress, which is every year increasing in extent under the liberal appropriations which are annually made for the purchase of books. It was therefore deemed preferable, and more consonant with the purposes of the Institution, to form a special library, which might constitute, as it were, a supplement to the library of Congress, and consist, for the most part, of complete sets of the proceedings and transactions of all the learned societies in the world, and of other serials essential for reference by students specially engaged in original scientific research. The efforts of the Institution to carry out this plan, which has since been sanctioned by Congress, have been eminently successful. Principally through exchanges, and occasionally by purchase, a more complete collection of the works above mentioned has been procured than is to be found in any library of the United States, or is easily met with even in Europe. The Institution has been assisted in making this collection by the liberality of many of the older libraries of the eastern continent, which, on application, have furnished from their duplicates volumes and even whole sets to complete series of works long since out of print, and which, in some cases, could not have been obtained through any other means. The Library is also quite rich in monographic or special treatises in the physical and natural sciences, lacking as yet, it is true, some of the more expensive volumes, but still affording the means of prosecuting almost any scientific investigation.

One specialty of the Library consists of the large number of maps and charts, obtained by exchange from geographical and hydrographical establishments, &c. This collection is as complete as any in the country.

No effort is spared to render the Library of the Institution conducive to the advance of science. Several editions of the catalogue of serial works have been published.

In 1867 the care of the library was transferred to the library of Congress, subject to be recalled at any time on certain conditions. The books are now catalogued and bound at the expense of the Government, while the officers and collaborators of the Institution have the same use of them as formerly, with greatly increased facilities from access to the larger collection of books in the National Library. The Institution still sends its publications, in exchange, to other establishments at home and abroad, and desires to increase its library by transactions of societies, and serial and scientific works.

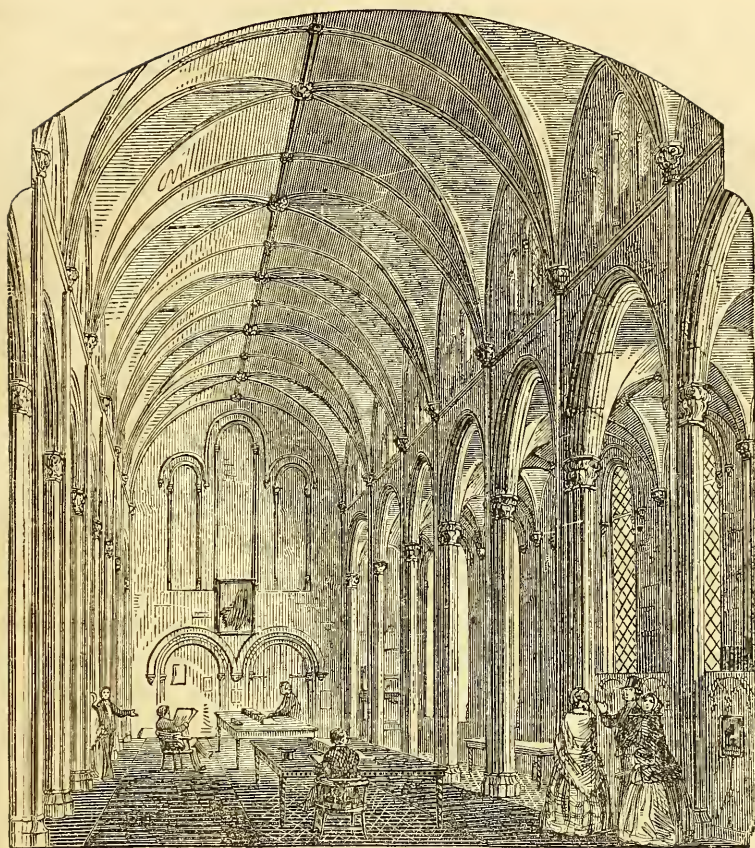


THE LIBRARY.

In the large hall at the south entrance to the building are a number of articles of special interest. The most prominent of these is the ancient SARCOPHAGUS, which was brought to this country on the frigate *Constitution*, by Commodore Elliott, from Beirut, in Syria, in 1839. This Sarcophagus was believed to be the repository of the remains of a Roman Emperor, and was intended for those of President ANDREW JACKSON. The General, however, refused to accept the gift, saying "I cannot consent that my mortal body shall be laid in a repository prepared for an Emperor or a King—my republican feelings and principles forbid it—the simplicity of our system of Government forbids it."

A *plank* from the redwood tree, and a piece of *bark* from the famous giant tree of California, will attract attention, as well as an immense mass of *copper* from Lake Superior.

Among the most interesting objects in this part of the collection are several *idols* from Central America, presented by Hon. E. G. Squier, late United States Minis-



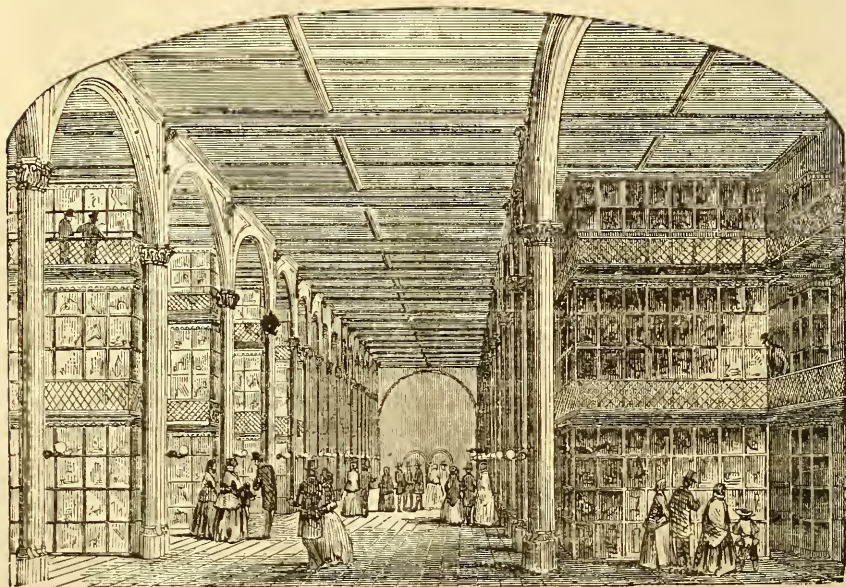
ter to Nicaragua. The largest statue, carved in black basalt, was obtained from the Island of Momotombita, in Lake Managua, where there was a temple or sacred place. The figure with the sphinx-like head-dress is also from the same locality. One or two of the other statues, by the Indians of the Pueblo of Subtiava, near Leon, having been buried a great number of years, and the locality carefully concealed, they are somewhat mutilated. A small group of these monuments exists in the depths of the forest midway between Leon and the Pacific, which is still secretly visited by the Indians for the performance of dances and other rites pertaining to their primitive religion. The small figure resembling some animal *couchant* was, until very recently, preserved on a remarkable rock on the side of the volcano of Omatepec, and regarded with high veneration by the Indians. It was only after many years of search that the priests were able to find and remove it. The granite vase, distinguished by the ornaments called *grecques* by Humboldt, (and which characterize the ruins at Mitla, in Mexico,) was dug up near the city of Nicaragua. The spot had been a cemetery of the ancient inhabitants.

Another relic of the same material, and with a like style of ornament, accompanies the vase, and was found in the same neighborhood. It seems to have been designed as a pedestal for a small statue. There are also several vases, in which the bones and ashes of the dead were packed after the decomposition of the flesh or after burning.

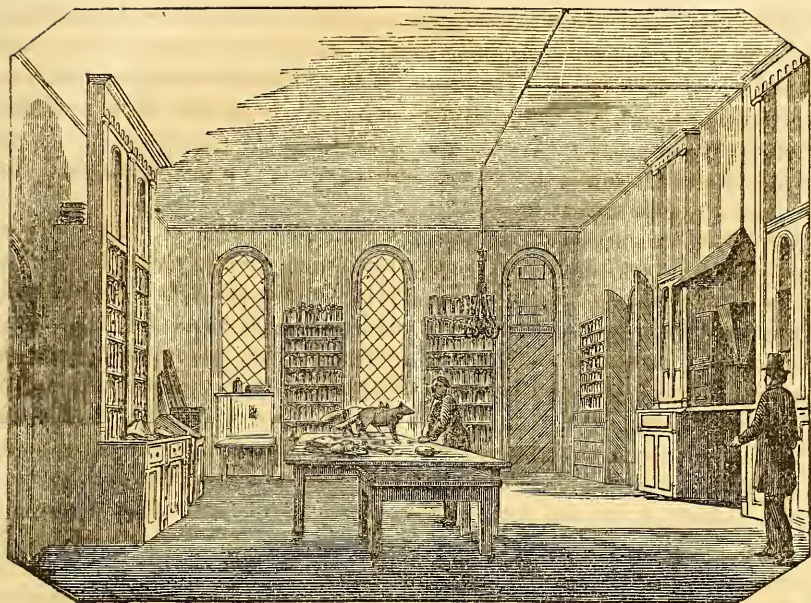
The largest and most elaborate monuments in Nicaragua exist in the little Island of Pensacola, near the base of the extinct volcano of Momobacho. They weigh a number of tons each, and are distinguished as being wrought from blocks of sandstone—a material which is not found on the island. Two of the statues of the Smithsonian collection are from the Island of Zapatero, in Lake Nicaragua, where once existed one of the most imposing aboriginal temples of the country. Here, among the ruins of the *teocalli*, or high-places of the former inhabitants, were found entire statues, besides the fragments of many others, several broken sacrificial stones, etc.

The Museum.

The Smithsonian Institution is now in possession of the best collection of the larger North American and European mammalia, both skins and skeletons, to be found in the United States. In birds it is only second to the collection of the Philadelphia Academy of Natural Sciences—the latter being without doubt the most extensive and perfect now extant. Of fish the Smithsonian has a greater number than is to be found in any cabinet, except that of Professor Agassiz.



THE MUSEUM.



LABORATORY OF NATURAL HISTORY

It should be understood that the Smithsonian Institution does not enter upon grounds already occupied, and therefore it is not an object to collect specimens promiscuously, or those usually found in other museums. Still the collection of this Institution is now attractive to the general visitor and curiosity seeker; and the student of natural history will here find much that will be sought in vain elsewhere. Duplicate specimens are often exchanged for those in other collections, and all the objects are open for the study and examination of those engaged in this line of research. Applications for such facilities are numerous, and have always been granted. The preparation of most of the important papers on natural history published within a few years in this country has been aided in this way by the Institution.

The act of Congress establishing the Institution provides as follows:—

SEC. 6. That, in proportion as suitable arrangements can be made for their reception, all objects of art and of foreign and curious research, and all objects of natural history, plants, and geological and mineralogical specimens belonging, or hereafter to belong, to the United States, which may be in the city of Washington, in whosoever custody the same may be, shall be delivered to such persons as may be authorized by the Board of Regents to receive them, and shall be arranged in such order, and so classed, as best facilitate the examination and study of them, in the building so as aforesaid to be erected for the Institution; and the Regents of said Institution shall afterwards, as new specimens in natural history, geology, or mineralogy, may be obtained for the museum of the Institution, by exchange of duplicate specimens belonging to the Institution, (which they are hereby authorized to make,) or by any donation, which they may receive, or otherwise, cause such new specimens to be also appropriately classed and arranged.

Under these provisions, the Institution has received and taken charge of such government collections in mineralogy, geology, and natural history as have been made since its organization. The amount of these has been very great, as all the United States Geological, Boundary and Railroad Surveys, with the various topographical, military, and naval explorations, have been, to a greater or less extent, ordered to make such collections as would illustrate the physical and natural history features of the regions traversed.

Of the collections made by the government expeditions, those of fifty are now deposited with the Smithsonian Institution, embracing more than five-sixths of the whole amount of materials collected. The principal expeditions thus furnishing collections are the United States Geological Surveys of Doctors Owen, Jackson, and Evans, and of Messrs. Foster and Whitney; the United States and Mexican Boundary Survey; the Pacific Railroad Survey; the Exploration of the Yellow Stone, by Lieutenant Warren; the Survey of Lieutenant Bryan; the United States Naval Astronomical Expedition; the North Pacific Behring Straits Expedition; the Japan Expedition, and the Paraguay Expedition.

The Institution has also received, from other sources, collections of greater or less extent, from various portions of North America, tending to complete the government series.

The collections thus made, taken as a whole, constitute the largest and best series of the minerals, fossils, rocks, animals, and plants of the entire continent of North America, in the world. Many tons of geological and mineralogical specimens, illustrating the surveys throughout the West, are embraced therein. There is also a very large collection of minerals of the mining regions of Northern Mexico, and of New Mexico, made by a practical Mexican geologist, during a period of twenty-five years, and furnishing indications of many rich mining localities within our own borders, yet unknown to the American people.

It includes, also, with scarcely an exception, all the vertebrate animals of North America, among them many specimens each of the Grizzly, Cinnamon, and Black Bears; the Panther, Jaguar, Ocelot, and several species of Lynx or Wildcat; the Elk, the Mexican, Virginian, White-tailed, Black-tailed, and Mule Deer; the Antelope, Rocky Mountain Goat and Sheep; several species of Wolves and Foxes, the Badger, Beaver, Porcupine, Prairie Dog, Gopher, and also about seven hundred species of American Birds, four hundred of Reptiles, and eight hundred of Fishes, embracing Salmon, Trout, Pike, Pickerel, White Fish, Muskalonge, Bass, Redfish, &c.

The greater part of the Mammalia have been arranged in walnut drawers, made proof against dust and insects. The birds have been similarly treated, while the reptiles and fish have been classified, as, to some extent, have also been the shells, minerals, fossils, and plants.

The collections are increasing so rapidly that it will soon be impossible, from the small part of the Smithsonian income which can be devoted to this purpose, to properly sustain a large museum, and a National Museum should be established by the Government on a scale commensurate with the resources, productions, and character of the country.

The fund of a foreigner intended for the "increase and diffusion of knowledge among men" should not be absorbed in local objects and in doing that which the Government should in honor and good faith do itself.

The Institution, if relieved of the charge of the show museum, would devote its energies in the way of advancing natural history by instituting original explorations in all parts of the world, making collections and distributing duplicates to all other museums.

Meteorites.

In the Museum hall may be seen a meteorite, from Northern Mexico, which weighs 250 pounds.

It was brought to this country by Lieutenant Couch, of the United States Army, he having obtained it at Saltillo. It was said to have come from the Sancha estate, some fifty or sixty miles from Santa Rosa, in the north of Coahuila; various accounts were given of the precise locality, but none seemed very satisfactory. When first seen by Lieutenant Couch, it was used as an anvil, and had been originally intended for the Society of Geography and Statistics in the city of Mexico. It is said, that where this mass was found there are many others of enormous size; but such stories, however, are to be received with many allowances. Mr. Weidner, of the mines of Freiberg, states, that near the southwestern edge of the Balson de Mapimi, on the route to the mines of Parral, there is a meteorite near the road of not less than a ton weight. Lieutenant Couch also states, that the intelligent, but almost unknown, Dr. Berlandier, writes in his journal of the Commission of Limits, that at the hacienda of Venagas, there was (1827) a piece of iron that would make a cylinder one yard in length, with a diameter of ten inches. It was said to have been brought from the mountains near the hacienda. It presented no crystalline structure, and was quite ductile.

Another Meteorite to be seen here is still more curious and interesting, from its remarkable size and appearance. It is in the shape of a ring much heavier on one side. Its greatest exterior diameter is 49 inches; the least 38 inches; width of central opening 23 inches; width of thickest part of the ring $17\frac{1}{2}$ inches. It weighs 1400 lbs. Its composition is principally of iron. It was discovered in Sonora by Jesuit missionaries, brought to Tucson in Arizona, and was sent, through the influence of Dr. Irwin, U. S. A., by Mr. Augustine Ainsa, to Hermosillo. In May, 1863, Mr. Jesus Ainsa brought it to San Francisco, and shipped it to the Smithsonian Institution.

What has been done.

The following is a sketch of the labors of the Institution, and illustrates the capability of the plan of operations for producing important results in the way of *increasing* and *diffusing* knowledge among men:—

Publications.—Three classes are issued.

1. A quarto series, entitled "SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE," issued in volumes, each containing one or more separate articles. This includes memoirs, embracing the records of extended original investigations and researches, resulting in what are believed to be new truths, and constituting positive additions to the sum of human knowledge.

2. An octavo series, entitled "SMITHSONIAN MISCELLANEOUS COLLECTIONS," consisting of reports on the present state of our knowledge of particular branches of science; instructions for collecting and digesting facts and materials for research; lists and synopses of species of the organic and inorganic world; museum catalogues; reports of explorations; aids to bibliographical investigations, etc., generally prepared at the express request of the Institution, and at its expense.

3. Another octavo series, consisting of the Annual Reports of the Institution to Congress, called "SMITHSONIAN REPORTS." These include the official reports of the Secretary to the Board of Regents of the operations and condition of the Institution; the reports of Committees of the Board; abstracts of lectures delivered before the Institution; extracts from correspondence; original or translated articles relating to the history and progress of science, etc.

The following rules have been observed in the distribution of the first and second series:

1. They are presented to all learned societies of the first class which publish transactions, and give copies of these, in exchange to the Institution.

2. To all foreign libraries of the first class, provided they give in exchange their catalogues and other publications, or an equivalent, from their duplicate volumes.

3. To all the colleges in actual operation in this country, provided they furnish, in return, meteorological observations, catalogues of their libraries and of their students, and all other publications issued by them relative to their organization and history.

4. To all States and Territories, provided they give, in return, copies of all documents published under their authority.

5. To all incorporated public libraries in this country, not included in any of the foregoing classes, now containing 10,000 volumes; and to smaller libraries, where a whole State or large district would be otherwise unsupplied.

Institutions devoted exclusively to the promotion of particular branches of knowledge, receive such articles published by the Institution as relate to their objects. Portions of the series are also given to institutions of lesser grade not entitled, under the above rules, to the full series, and also to the meteorological correspondents of the Institution.

The Reports are of a more popular character, and are presented

1. To all the meteorological observers and other collaborators of the Institution.
2. To donors to its Library or Museum.
3. To colleges and other educational establishments.
4. To public libraries and literary and scientific societies.
5. To teachers or individuals who are engaged in special studies, and who make direct application for them.

Besides the works which have been published entirely at the expense of the Institution, aid has been furnished by subscription for copies to be distributed to foreign libraries of a number of works which fall within the class adopted by the programme. The principal works of this kind for which subscriptions have been made are as follows: Agassiz's Contributions to Natural History, Gould's Astronomical Journal, Shea's American Linguistics, Runkle's Mathematical Monthly, Deane's Fossil Footprints, Tuomey & Holmes' Fossils of South Carolina, Peirce's Analytic Mechanics.

Meteorology.—The investigation of all questions relative to meteorology has been an object to which the Institution has devoted special attention, and one of its first efforts was to organize a voluntary system of observation, which should extend as widely as possible over the whole of the North American continent. It induced a skilful artisan, under its direction, to commence the manufacture of carefully compared and accurately graduated instruments, now generally known as the Smithsonian standards. It prepared and furnished a series of instructions for the use of the instruments and the observations of meteorological phenomena; also three series of blank forms as registers.

It next organized a body of intelligent observers, and in a comparatively short time brought the system into practical operation; each year the number of observers increased, and where one ceased his connection with the enterprise, several came forward to supply his place. By an arrangement with the Surgeon General of the army, the observations made at the United States military posts in different parts of the country, and also the system which had previously been established by the State of New York, were remodelled so as to harmonize with that of the Institution. Gentlemen interested in science residing in the British provinces, and at nearly all the posts of the Hudson's Bay Company, also in Mexico, Central America, the West Indies, and some places in South America, &c., joined in this enterprise. All these contribute their services without compensation. Their only reward is the satisfaction of co-operating with each other and the Institution in the effort to supply data and materials for investigation. Any returns, indeed, which the Institution has in its power to make are gladly rendered in a hearty acknowledgment of assistance, and in copies of all the Smithsonian publications likely to be of interest.

The publications of the Institution contain many memoirs which have tended to advance the science of meteorology. Among these may be mentioned the meteorological and physical tables prepared at the expense of the Institution by Professor Guyot, and filling a large octavo volume of the Miscellaneous Collections.

No work extant answers the same purpose with the one referred to, which has hence become a general standard of reference, the constant demand for it as well in Europe as America having required the printing of several successive editions.

The results of the reductions for five years previous to 1860 have been published in two volumes of nearly 2,000 quarto pages, containing a mass of materials of great value in determining the average temperature, fall of rain, barometrical pressure, moisture, direction of the wind, and time of various periodical phenomena relative to plants, animals, &c.

In addition to these large and important volumes, other works have been published by the Institution which have had a marked influence on the progress of meteorology. Among these may be mentioned the works of Professor Coffin, on the winds of the Northern Hemisphere; of Mr. Chappelsmith, on a tornado in Illinois; of Professor Loomis, on a great storm which pervaded both America and Europe; the reduced observations for twenty-eight years of Professor Caswell, at Providence, Rhode Island; of Dr. Smith, for twenty years in Arkansas; of Dr. Kane and Captain McClintock, in the Arctic Seas; on the heat and light of the sun at different points, by Mr. Meech; on the secular period of the aurora, by Professor Olmsted; the occurrence of auroras in the Arctic regions, by Mr. P. Force, &c.

Besides these, a series of meteorological essays embodying many of the results obtained from the investigations at the Institution has been prepared by the Secretary, and been published in the Agricultural Reports of the Patent Office.

Astronomy.—The Institution has advanced the science of astronomy both by its publications and the assistance rendered to observers. To facilitate astronomical observations it prepared and published for six years an annual list of occultations of the principal stars by the moon, and printed and distributed a series of tables for determining the perturbations of the planetary motions, the object of which determination is to facilitate the calculation of the places of the heavenly bodies. These tables have accomplished the desired end, saving to the practical astronomer an immense amount of tedious and monotonous labor.

The name of the Institution has been favorably connected with the history of the interesting discovery of the planet Neptune. From a few of the first observations which had been made on this planet, Mr. Sears C. Walker calculated its approximate orbit, and by this means tracing its path through its whole revolution of 166 years, he was enabled to carry it backward until it fell among a cluster of stars, accurately mapped by Lalande, towards the close of the last century. After minute inspection he was led to conclude that one of the stars which had been observed by Lalande in 1795, was the planet Neptune. He was thus supplied with the amount of its motion for upwards of fifty years, from which he deduced a much more perfect orbit, and was enabled to construct an ephemeris giving the place of the planet for several years in succession. These investigations, so interesting to astronomy and honorable to this country, were prosecuted and published at the expense of the Smithsonian Institution.

To render more generally accessible to practical astronomers in this country the theory of the motion of the heavenly bodies by the celebrated Gauss, the Institution shared the expense of publishing a translation of this treatise from the Latin, by Admiral Davis. It furnishes a complete system of formulas for computing the movements of a body in any of the curves belonging to the class of conic sections, and a general method of determining the orbit of a planet or a comet from three observations, as seen from the earth.

For a number of years aid was afforded to the publication of Gould's American Astronomical Journal, which rendered good service to the science by making promptly known to foreign observers the results of the labors of their contemporaries in America. It has also reduced and published at its own expense the astronomical observations made by Dr. Kane in the Arctic regions, and has also published those made in the same regions by Dr. Hayes.

Congress having authorized, in 1849, an astronomical expedition under Lieutenant Gilliss to the Southern Hemisphere, for the purpose of determining the parallax of the planets, and consequently their distance from the sun, by observations on Venus and Mars, accidentally failed to make the appropriation for instruments. This omission was supplied by the Institution, which was subsequently indemnified for the expense by the Chilean government.

In the observation of all the large solar eclipses which have happened since the date of its organization, the Institution has actively and efficiently co-operated by publishing projections of the phases and times of their occurrence in different parts of America.

Under its auspices, and partly at its expense, an expedition was inaugurated to observe the great eclipse of 1858 in Peru, from which data of value for the improvement of solar and lunar tables were determined, besides facts of interest in regard to the physical constitution of the sun.

Assistance was also rendered to the expeditions under the direction of the Coast Survey, to observe the eclipse of July 18, 1860, one of which was sent to Labrador, under the charge of Professor S. Alexander, of New Jersey, and the other to Washington Territory, under that of Lieutenant Gilliss.

To these may be added an account of an instrument invented by Rev. T. Hill, President of Harvard College, for the projection of eclipses.

Physics and Chemistry.—The Institution has fostered these sciences in many different ways; among others, by importing models of the most approved articles of apparatus, and making them known to scientific men through lectures and otherwise.

It has instituted an extensive series of experiments on building materials, particularly in reference to those employed by the government in the construction of the Capitol and other public edifices; also a like series on acoustics, as applied to public halls, and the principles deduced from these practically applied in the construction of a model lecture room. It has made a very extended series of experiments on different substances employed for light-house illumination, from which

has resulted the substitution of lard oil for sperm oil and the consequent annual saving of a large amount of money to the government.

In compliance with requests made by different departments of the government, and of Congress, particularly since the war, it has conducted various series of investigations, principally in relation to questions involving mechanical, chemical, and physical principles, and has made reports on subjects of this kind amounting, in the aggregate, to several hundred.

To facilitate researches, a laboratory has been established and kept constantly in working condition, the privilege of using it having been given to various competent persons for experimenting in different branches of physical science.

The most important publications under this head are the researches relative to electric currents, by Professor Secchi; on the explosibility of nitre, by Dr. Hare; on the ammonia-cobalt bases, by Drs. Gibbs and Genth; and on astronomical photography, by Dr. Henry Draper.

A valuable report on recent improvements in the chemical arts, by Booth & Morfit, was published in 1852, and there have been given in the Annual Reports of the Institution a series of translations and articles presenting a view of the progress of physics and chemistry from year to year, since 1853, among which we may particularly notice the translation of Muller on recent contributions to electricity, and the reprint of Powell on radiant heat.

Terrestrial Magnetism.—The subject of terrestrial magnetism has been prosecuted simultaneously with that of meteorology, and an observatory was erected in the Smithsonian grounds, fitted up with the most approved instruments, and conducted under the joint auspices of the Institution and of the Coast Survey. After remaining in operation for several years, the instruments were transferred to Key West, as a remote station where observations were still more desirable. Instruments were also furnished an expedition to Mexico, and used with much success by Mr. Sonntag, whose results were published in the Smithsonian Contributions to Knowledge. Apparatus was also furnished to Dr. Kane, Dr. Hayes, and other explorers, by means of which valuable results were obtained.

Of the more important publications of the Institution, which have tended to advance this science, may be mentioned the articles, by Dr. Locke, on the dip and intensity; the elaborate discussion, by Professor Bache, of the magnetic observations made at Girard College from 1841 to 1845; the report on magnetical observations in the Arctic Seas, by Dr. Kane, reduced at the expense of the Institution, by Mr. C. Schott; and those made in Pennsylvania and adjacent States, by Professor Bache, and in Mexico, by Mr. Sonntag.

Explorations.—In the deficiency of means for more extended operations, the efforts of the Institution in the line of explorations and collection are confined, as strictly as possible, to America. Arctic America, all the unknown portions of the United States, Mexico, Central and South America, and the West Indies have been laid under contribution for facts and materials by which to advance science.

An eminently useful influence has been exerted by the Institution through the aid it has afforded in the organization of the different government explorations by land and by sea. Whether by official representations to the heads of departments, or personal influence with officers and employés, it has secured the engagement of individuals competent to collect facts and specimens; it has instructed persons thus engaged, and others, in the details of observation; it has superintended the preparation, and, in some cases, borne the expense of the necessary outfits; has furnished fresh supplies from time to time to the collectors while in the field; received the collections made, and preserved them for future study, or at once consigned them to the hands of competent persons, both at home and abroad, for investigation; directing the execution of the necessary drawings and engravings for the reports, and finally superintending the printing and even the distribution of any available copies of the completed works to institutions of science. Prior to the establishment of the Institution but little had been done by our government in the way of scientific explorations, with the exception of that under Captain Wilkes. But since then nearly every United States expedition, whether a survey for a Pacific railroad route, a boundary line between the United States and regions north or south of it, or within its borders, a wagon-road across the Rocky Mountains, or an ordinary topographical exploration, has been influenced and aided more or less, as above stated.

Besides these, similar explorations have been carried on without any reference to the government, and either entirely or in a great measure at the expense of the Institution, and always at its suggestion, or under its direction. Prominent among these may be mentioned the three years' researches in the Arctic regions, by Mr. Kennicott, with the co-operation of gentlemen of the Hudson's Bay Company; of Mr. Drexler, in the region of Hudson's Bay, and also in the Rocky Mountains; of Mr. Coues, in Labrador; of Lieutenant Feilner, in Nebraska and Northern California; of Mr. John Xantus, at Fort Tejon, Cape St. Lucas, and in Western Mexico; of Lieutenant Trowbridge, on the coast of California; of Drs. Cooper and Suckley, in Western America generally; of Drs. Coues and Beers, in Kansas, New Mexico, and Arizona; of Dr. Irwin, in Arizona; of Dr. Hitz, about Laramie Peak; of Lieutenant Couch, in Texas and Mexico; of G. Wurdeman, Lieutenant Wright, Captain Woodbury, and others, in Florida, and the Gulf of Mexico; of Dr. Sartorius, Professor Sumichrast, Dr. Berendt, in Mexico; Dr. Von Frantz, J. Carniol, in Costa Rica; of Mr. March, in Jamaica; of Mr. Wright, Dr. Gundlach, Professor Poey, in Cuba; Judge Carter, in Bolivia, besides many others.

In addition to the collections which have been received from explorations organized under the direction of the Institution, large numbers of duplicate specimens have been presented by the meteorological observers and other Smithsonian collaborators, the whole forming a body of material for the illustration and study of the American continent unequalled by any collection previously made. The results of the explorations, however, as might be inferred, have not been confined to specimens alone, but have furnished information relative to the topography, geology, physical geography, ethnology, and the living fauna of the country and regions visited.

The results have been published by government, the Institution, or other parties. The extent and importance of these publications may be seen in the volumes of the reports of the Pacific Railroad and Mexican boundary surveys; of the United States astronomical expedition to Chili, under the late lamented Captain Gilliss; of Captain Stansbury's exploration of Utah; of Lieutenant Michler's of the Isthmus of Darien, &c. &c; in the volumes of the Smithsonian publications, and in the transactions of nearly all the scientific institutions in the United States.

In order to facilitate the operations of collectors, a series of directions and circulars have been prepared and widely distributed, for collecting, preserving, and transporting specimens of natural history, and also special instructions as to the collecting of nests, eggs, shells, insects, &c.

Description and Distribution of Collections and Specimens.—The object of making these collections, in conformity with the policy of the Institution, was not merely to supply a large museum in Washington with permanent specimens or duplicates for exchange, but to furnish the naturalists of the world with the materials for advancing the science of the natural history of North America, and of facilitating the study of its various branches by supplying museums, both in the United States and in Europe, with sets of type specimens.

In pursuance of this object, full sets of the specimens collected have been submitted to a large number of naturalists, both in this country and abroad, for critical study and description, and it is not too much to say that scarcely a monographic investigation has been conducted for many years past in any branch of American zoology which has not derived part or the whole of its material from the Smithsonian collections. Duplicates of the specimens, when described, have been made up into series for distribution, always accurately labelled, and are usually types of some published investigation. The average of such distribution has, for the last ten years, been at least ten thousand specimens annually, and the whole number distributed over a quarter of a million. In this way all the older museums in this country and Canada have been largely increased, and the foundation for several new establishments of a similar kind has been furnished. To all colleges and academies making special application, labelled specimens have also been presented.

This distribution of specimens is very different from the ordinary exchanges conducted between institutions or individuals, which usually involve the return of an equivalent. The question with the Smithsonian Institution is, not what can be had in return, but where a particular specimen or series of specimens can be placed so as best to advance the cause of science, by being most accessible to the largest number of students engaged in original investigations.

Palæontology, Geology, Physical Geography, &c.—Appropriations have been made for investigations of the surface formation of the Connecticut valley, by Professor E. Hitchcock, and for the collection of materials for the illustration of the geology and palæontology of particular regions. Appropriation has also been made to Professor Guyot for a barometrical survey of the different parts of the

Alleghany Mountains, and to other persons for collecting observations on heights, as determined in different parts of the country by the various canal and railway surveys.

The publications on these subjects, besides the papers of Professor Hitchcock on surface geology, are as follows: A Memoir on *Mosasaurus*, by Dr. R. W. Gibbs. On the Extinct Species of the Fossil Ox and Sloth of North America, and on the Ancient Fauna of Nebraska, by Dr. Leidy. On the Physical Geography of the Mississippi Valley, by Charles Ellet. On the Law of Deposit of Flood Tide, by Admiral Davis. On the Fluctuations of the Level of the great American Lakes, by C. Whittlesey. On the Palæontology of the Upper Missouri, and Check List of Miocene Cretaceous and Jurassic Invertebrata, by F. B. Meek. A Memoir, by Dr. Leidy, on the Extinct Reptiles of the Cretaceous period.

The Institution has published a check list of *minerals*, with their symbols, prepared by Mr. Egleston, with special reference to facilitating the labelling of the Smithsonian minerals and the exchange of specimens, and it may be mentioned that the Institution has made an extensive distribution of specimens of building stone employed by the government.

Botany.—This branch of general natural history has been advanced by the Institution, not only by means of the publication of the papers of original memoirs, but also by explorations and collections made at the expense of the Smithsonian Fund. The most important work which has been published is a large quarto volume, illustrated by expensive colored plates, of the sea plants of the entire American coast. The work was written for the Institution by Dr. Harvey, of the University of Dublin, and has been the means of rendering this family of the vegetable kingdom more generally known. The Institution has also published several papers on the plants of New Mexico and California, by Dr. Gray, of Cambridge, and Dr. Torrey, of New York.

Duplicates of the specimens described have been presented to institutions at home and abroad. Considerable labor has also been expended in the preparation of an original report on the forest trees of America, by Dr. Gray.

General Zoology.—A large part of the collections made by the Institution belong to the general class of zoology, intended to advance the study of animal life upon the continent of America.

The ornithology of America has always been a specialty of the Smithsonian Institution, more efforts having been made to perfect its collection in this department than any other. The Institution has published the first part of a work by Dr. T. M. Brewer, suitably illustrated, on the distribution and habits of North American birds during the breeding season, with descriptions and figures of their eggs, the materials being derived entirely from the collections of the Institution, and mostly made at its special request. This is the first separate work on North American zoology ever prepared. A catalogue of North American birds, prepared by Professor S. F. Baird, has been extensively used at home and abroad in labelling collections.

Professor Baird has prepared a revision, or posting up, of our knowledge of North American ornithology to the present date, with the addition of the species of Central and South America and the West Indies. The materials being derived almost entirely from the specimens collected by the Institution, have been increased since the publication of the extensive work on the same subject, by Professor Baird, in the Pacific Railroad report, from 12,000 to 35,000.

The collections which have been made by the Institution for the illustration of mammalia have been very extensive, amounting to 10,000 specimens, and have not only included many duplicates of every species previously known, but a very large number entirely new to science. A catalogue of North American mammals, chiefly those collected by the Institution, prepared by Professor Baird, has been published and distributed to those interested in the study; also a monograph of North American bats, prepared by Dr. H. Allen. Materials are now in course of accumulation to complete the account of the classes of mammals of North America, which have not been included in the publications of the Institution and Pacific Railroad Reports.

As with all American vertebrata, the collections of reptiles and fishes have been very extensive, and numerous monographs or articles have been published relative to them in the Pacific Railroad Reports, and the proceedings of different natural history societies, the Institution having published a synopsis of the serpents of North America, and a monograph of the cottoids.

The Institution has materially aided the study of the entomology of this country, not only by the collections in that branch, but by preparing and publishing a series of works for the purpose of exhibiting the state of knowledge on the subject, and facilitating its further advancement. It has published and distributed the following under this head:—

Instructions for collecting and preserving insects, and catalogues, synopses, or monographs of the Diptera, Coleoptera, Lepidoptera, and Neuroptera, prepared by the most competent authorities in Europe and America.

It has also in course of preparation, works relative to the Hymenoptera, Homoptera, Hemiptera, Orthoptera, &c.

Conchology.—A large collection of specimens of shells was received from the United States exploring expedition, which has been much increased by subsequent additions. All the shells of the west coast of the United States, and those generally collected by the exploring expedition, were put into the hands of Mr. P. P. Carpenter, of England, the new ones described for publication, and the duplicates of the whole arranged for distribution to museums, colleges, and other establishments. The publications on this subject are, Lists of North American Shells, Circulars Relative to Collecting, an Elementary Introduction to the Study of Conchology, and an extensive work, in two octavo volumes, on the Bibliography of North American Conchology, by W. G. Binney, and a Monograph of the Corbiculidæ, by Temple Prime. Besides these, a number of articles are in the press or in course of preparation.

Microscopy.—Encouragement has been given to this branch of science, by importing, as samples, simple forms of working microscopes, and also by stimulating our native artists to greater exertion in the construction of this instrument, by ordering the best that could be produced. Samples of microscopic organisms have been collected and distributed to observers, and examinations and reports have been made on a large number of this class of objects sent to the Institution. The publications in regard to this subject are a number of papers by Professor Bailey, of West Point, and a very interesting Memoir, by Dr. Leidy, of Philadelphia, on a Fauna and Flora within Living Animals.

Physiology.—No experiments on this subject have been made under the immediate direction of the Institution, although it has furnished the materials for investigation by other parties. The publications in regard to it are Chemical and Physical Researches concerning North American Vertebrata, by Dr. J. Jones; Researches upon the Venom of the Rattlesnake, with an investigation of the Anatomy and Physiology of the Organs Concerned, by Dr. S. W. Mitchell; on the Breathing Organs of Turtles, by Drs. Mitchell and Morehouse; on the Anatomy of the Nervous System of Rana Pipiens, by Dr. J. Wyman; and on the Medulla Oblongata, by Dr. John Dean.

Ethnology and Philology.—One of the earliest efforts on the part of the Institution, was directed to the advancement of the science of American Ethnology. Its first publication, as well as introductory volume to the series of Smithsonian Contributions to Knowledge, being the work of Squier and Davis, on the Ancient Monuments of the Mississippi Valley, remains the standard treatise on this subject. This was followed by a similar work on the Antiquities of New York, by Mr. Squier; and those of Wisconsin, by Mr. Lapham; of Ohio and of Lake Superior, by Mr. Whittlesey; a Memoir on some Antiquities of Mexico, by Brantz Mayer; and a general introduction to the whole subject of American Archæology, by Mr. Haven, besides many articles of less extent in one or another of the Smithsonian series. Several pamphlets of instructions for making observations and collections in this science have also been issued.

In the department of Philology, also, the Institution has evinced its zeal and activity by the publication, among others, of the elaborate work on the Dakota Language, by Mr. Riggs; that on the Yoruba Language, by Mr. Bowen; and that on the Chinook Jargon, by Mr. Turner and Mr. Gibbs. To Mr. Shea, of New York, who is engaged in the preparation of a library of American languages, annual appropriations from the funds of the Institution have been made in furtherance of the publication of linguistic memoirs furnished by its correspondents.

Systematic efforts have been directed by the Institution to the collection of as perfect a series as possible of the specimens of American antiquities, and of those illustrative of the habits of the modern native tribes. Already an extensive collection has been accumulated, and the preparation and distribution of a series of colored casts of the more interesting specimens of aboriginal art have been commenced.

Correspondence.—The Institution has constantly received a large number of communications, asking information on a variety of subjects, particularly in regard to the solution of scientific questions, the names and characters of objects of natural history, and the analysis of soils, minerals, and other materials which pertain to the industrial resources of the country. Answers have in all cases been given to these inquiries, either directly by the officers of the Institution, or by reports from the Smithsonian collaborators. A considerable portion of the correspondence burned in the office of the secretary was of this character. The loss in this case is to be regretted, not only on account of the valuable information the letters and answers contained, but also on account of the illustration they afforded of the influence of the Institution, and the condition of the public mind at a given time. Every subject, connected with science which strongly attracts popular attention, never fails to call forth a large number of inquiries and suggestions.

International Exchanges.—To facilitate the direct correspondence between the learned institutions and scientific men of the two worlds, and the free exchange of their publications, has, from the first, been a special object of attainment with the Smithsonian Institution. Year by year its plans for this purpose have been modified and improved, until the system has become as nearly complete and satisfactory as the funds and force at its disposal will allow. At the present day it is the great medium of scientific intercommunication between the New World and the Old; its benefits and services being recognized alike by individuals, institutions, and governments. Its parcels pass all the custom-houses without question or interference, while American and foreign lines of transportation, with rare exceptions, vie with each other in the extent of the privileges accorded to it. To so great an extent has its sphere of activity been enlarged, that it is no exaggeration to say that a very large proportion of all international exchanges of the kind referred to are now made through its instrumentality. At the present time the Institution is prepared to receive, at periods made known through its circulars, any books or pamphlets of scientific, literary, or benevolent character which any institutions or individuals in America may wish to present to a correspondent elsewhere, subject only to the condition of being delivered in Washington free of cost, and of being accompanied by a separate list of the parcels sent. Where any party may have special works to distribute, the Institution is always prepared to furnish a list of suitable recipients. In many cases where works of value have been published by the United States or State governments, likely to be of importance to students abroad, application has been made by the Institution for copies, in most cases with success. The articles and volumes, when received, are assorted and combined into packages, and these, after being properly addressed and inclosed in boxes, are despatched to the agents of the Institution in London, Leipsic, Paris, and Amsterdam. The boxes are there unpacked, and the contents distributed through the proper channels; the returns for these transmissions are received by the same agents, and boxed and forwarded to Washington, from which point the parcels for other parties are sent to their proper destination. All the expense of

packing, boxing, agencies, freights, &c., being borne by the Institution, with the exception of the local conveyance of single parcels by express, or otherwise, within the United States.

The Fire.

On the 24th of January, 1865, a fire occurred at the Institution, which caused the destruction of the upper part of the main building, and the towers. The loss to the Institution was as follows: 1. The official, scientific, and miscellaneous correspondence, record books, and manuscripts in the Secretary's office. 2. The large collection of apparatus. 3. The personal effects of Smithson. 4. A large stock of tools and instruments. 5. All the duplicate copies of Smithsonian Reports on hand for distribution. 6. The wood-cuts of illustrations used in the Smithsonian publications.

Besides these, Mr. Stanley lost his gallery of Indian portraits, which had been deposited in the Institution for a number of years; and a large quantity of private property was destroyed belonging to persons connected with the Institution.

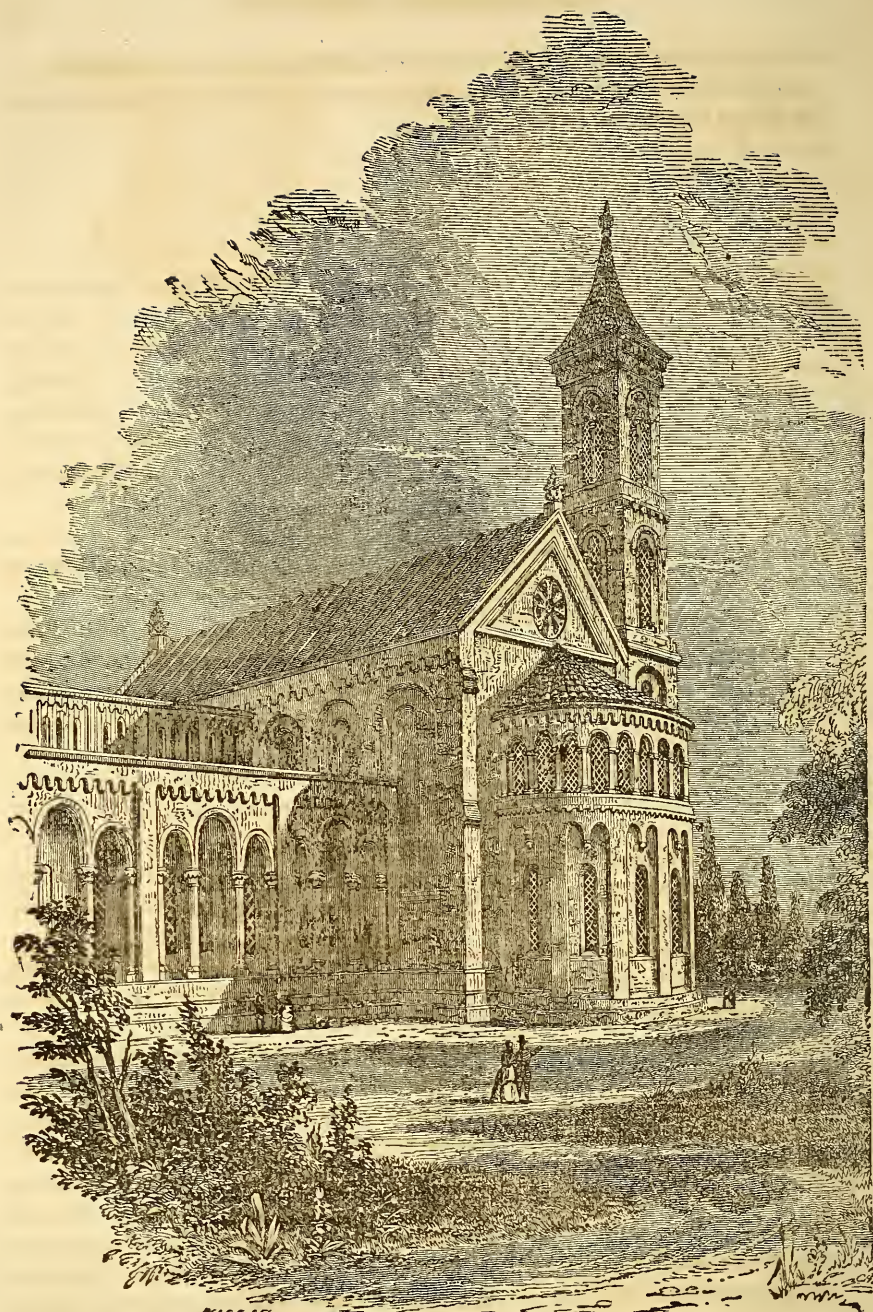
The fire, however, caused no interruption in the business of the Institution; the library, museum, and laboratory were uninjured; all its operations were carried on as usual, and plans were immediately adopted for the reconstruction with fire-proof materials of the parts of the building which had been damaged or destroyed.

The Grounds.

The grounds around the building were laid out by the distinguished horticulturist and landscape gardener, Downing, but he died while engaged in the prosecution of his plans.

We are indebted to the editor of the "Rural New Yorker," for the following remarks relative to this subject, and for the representation of the marble monument erected to his memory:—

"When the sad tidings of the death of Andrew Jackson Downing were announced, many hearts were stricken, and many countenances saddened. Every lover of rural life and rural taste felt that a friend, a brother, and a leader had fallen. The homes of hundreds, from the foundation stone to the gable point, spoke of the departed—even the trees and flowers of the garden told a tale of sadness. The furniture in our parlors, the books in our libraries, spoke too plainly to our wounded hearts of the loved and lost. Scarcely a city or village in our country but presented some monument of his skill and taste, something to remind the people how great and irreparable was their loss—cottages whose simple yet elegant adornings taught how truly *taste* may be independent of wealth; windows tempting the eye from loveliness within, to the glorious prospect without; stately trees that seemed to guard like sentinels the sacred precincts of home, and village churches whose walls

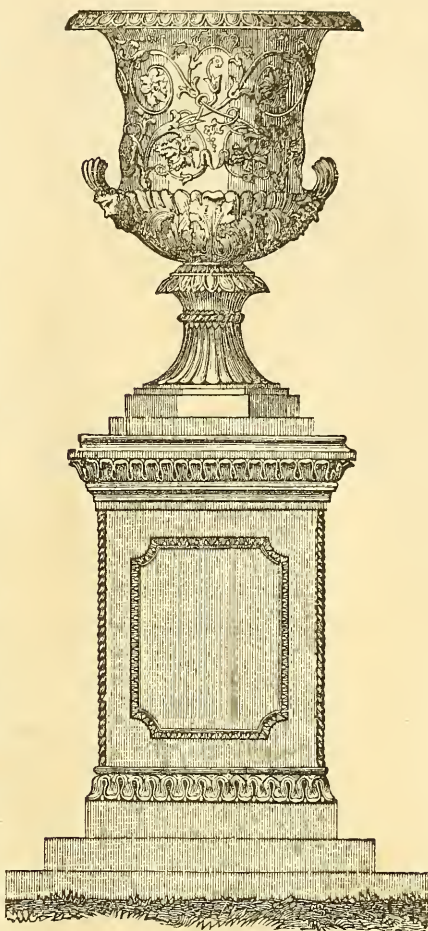


MADE DEL

W. B. G. G. G. G. G.

and spires spoke of religion to the heart. It was at once proposed, in all parts of the country, by Horticultural and other Societies, that some suitable monument should be erected to the memory of Mr. Downing, and in 1852, the *American Pomological Society* appointed a committee to superintend this work. The design adopted by the committee was furnished by Calvert Vaux, of Newburgh, N. Y., the late partner of Mr. Downing, and the work executed by Robert Launitz, an eminent sculptor of New York. The monument was erected in the grounds of the Smithsonian Institution, at Washington, and it is worthy of remark, that Mr. Downing was engaged in laying out and beautifying these grounds at the time of his death. The committee made their final report at the Pomological meeting in September, 1856. The funds were supplied by friends of Mr. Downing, in Philadelphia, Newburgh, Boston, Washington, Louisville, Buffalo, and Rochester.

The principal design of the monument consists in a large vase resting on a pedestal, the whole executed of the finest Italian marble. The pattern of the vase is taken from an antique of the chastest school. The vase is four feet in height, and measures three feet in diameter on its upper rim. The body is ornamented with rich arabesque; acanthus leaves surround the lower part. The handles rest on heads of satyrs, (the tutelar gods of groves and woods.) The pedestal, resting on a carved base, and being surmounted with a carved cornice, has on each side deep panels, relieved by carved mouldings. Each of the panels contains an inscription; that upon the Northern Front reads as follows:



DOWNING MONUMENT.

THIS VASE
Was erected by his Friends
IN MEMORY OF
ANDREW JACKSON DOWNING,
Who died July 28, 1852, aged 37 years.

He was born, and lived,
And died upon the Hudson River.

His life was devoted to the improvement of the national taste
in rural art,
an office for which his genius and the natural beauty amidst
which he lived had fully endowed him.
His success was as great as his genius, and for the death of few
public men,
was public grief ever more sincere.
When these grounds were proposed, he was at once
called to design them;
but before they were completed he perished in the wreck of the
steamer Henry Clay.
His mind was singularly just, penetrating, and original.
His manners were calm, reserved, and courteous.
His personal memory
belongs to the friends who loved him;
his fame to the country which honored and laments him.

Inscription upon the Southern Front :

“The taste of an individual,
as well as that of a nation, will be in direct proportion to the
profound sensibility
with which he perceives the beautiful in natural scenery.”
“Open wide, therefore,
the doors of your libraries and picture galleries,
all ye true republicans!
Build halls where knowledge shall be freely diffused among men,
and not shut up within the narrow walls of
narrower institutions.
Plant spacious parks in your cities,
and uncloset their gates as wide as the gates of morning to the
whole people.”

[*Downing's Rural Essays*]

Upon the Eastern Front is inscribed :

“Weep no more,
For Lycidus your sorrow is not dead,
Sunk though he be beneath the wat'ry floor,
So sinks the day-star in the ocean bed,
And yet anon repairs his drooping head,
And tricks his beams, and with new spangled ore
Flames in the forehead of the morning sky;
So Lycidus sunk low, but mounted high
Through the dear might of Him that walked the waves ”

Upon the Western Front is this Inscription :

I climb the hill from end to end,
Of all the landscape underneath
. I find no place that does not breathe
Some gracious memory of my friend

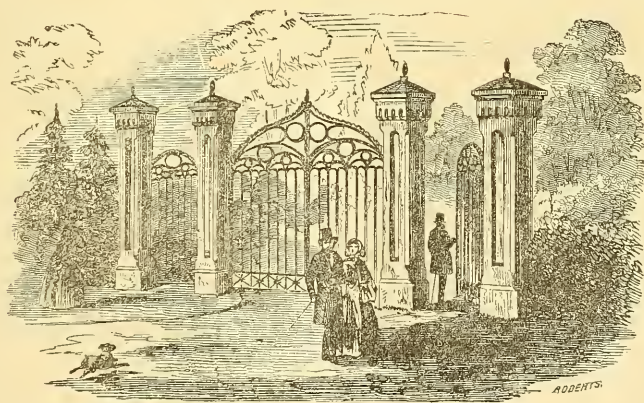
'Tis held that sorrow makes us wise,
 Yet how much wisdom sleeps with thee,
 Which not alone had guided me,
 But served the seasons that may rise ;
 And doubtless unto thee is given
 A life that bears immortal fruit,
 In such great offices as suit
 The full grown energies of Heaven.
 And love will last as pure and whole
 As when he loved me here in time,
 And at the spiritual prime
 Re-waken with the dawning soul.

On the Base of the Pedestal is the following :

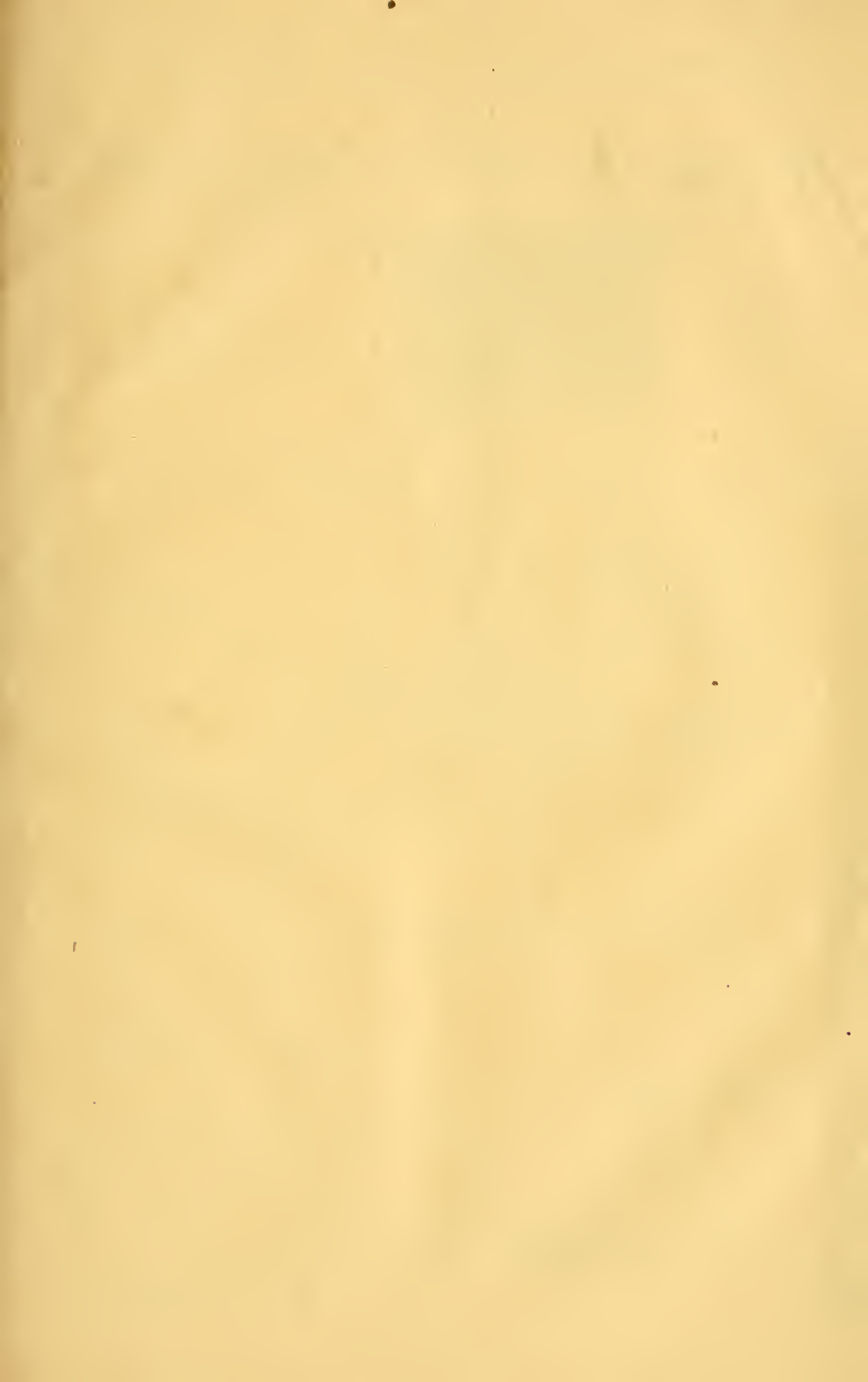
THIS MEMORIAL
 Was erected under a resolution passed at Philadelphia,
 in Sept., 1852, by the
 AMERICAN POMOLOGICAL SOCIETY,
 of which Mr. Downing was one of the
 original founders.

MARSHALL P. WILDER, *President*

The whole monument with its granite plinth is nine feet four inches in height
 and cost \$1 600



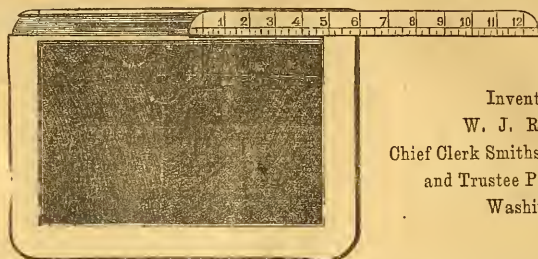
THE GATEWAY.



A NEW AND USEFUL SCHOOL INVENTION.

THE RULER AND PENCIL CASE SLATE.

No addition
to
Weight or Size.



Invented by
W. J. RHEES,
Chief Clerk Smithsonian Institution,
and Trustee Public Schools,
Washington.

A RULER marked with a scale of INCHES, etc., slides in a groove on the side of the slate frame, the pencil case being a shorter and deeper groove, covered by the sliding ruler.

THE ADVANTAGES OF THIS SLATE OVER ALL OTHERS ARE:

1. It provides a RULER, useful not only to children, but adults.
2. It furnishes a FOOT RULE, training the eye to a knowledge of size, distances, etc.
3. It affords a ready means of measuring lengths, etc.
4. It facilitates acquiring a knowledge of fractions, and aids in arithmetical operations.
5. It is of great use in drawing, especially maps, geometrical forms, etc.
6. It saves slate-pencils from breaking, this item alone paying the cost of the slate in a few weeks.
7. It promotes a habit of neatness and order—a place being provided for the pencil, the pencil can always be put in its place.
8. The noise in schools from pencils rolling down desks can be prevented.
9. It has the strongest frame and the best quality of Pennsylvania slate in the market.
10. With all these improvements it is sold at about the same price as ordinary slates.

IT IS RECOMMENDED BY

Hon. HENRY BARNARD, of the Department of Education; Prof. Jos. HENRY, of the Smithsonian Institution; Dr. MACLEAN, of Princeton College; Dr. BARNARD, of Columbia College, New York; Prof. JOHN S. HART, of the State Normal School of New Jersey; and all school officers and teachers who have seen it.

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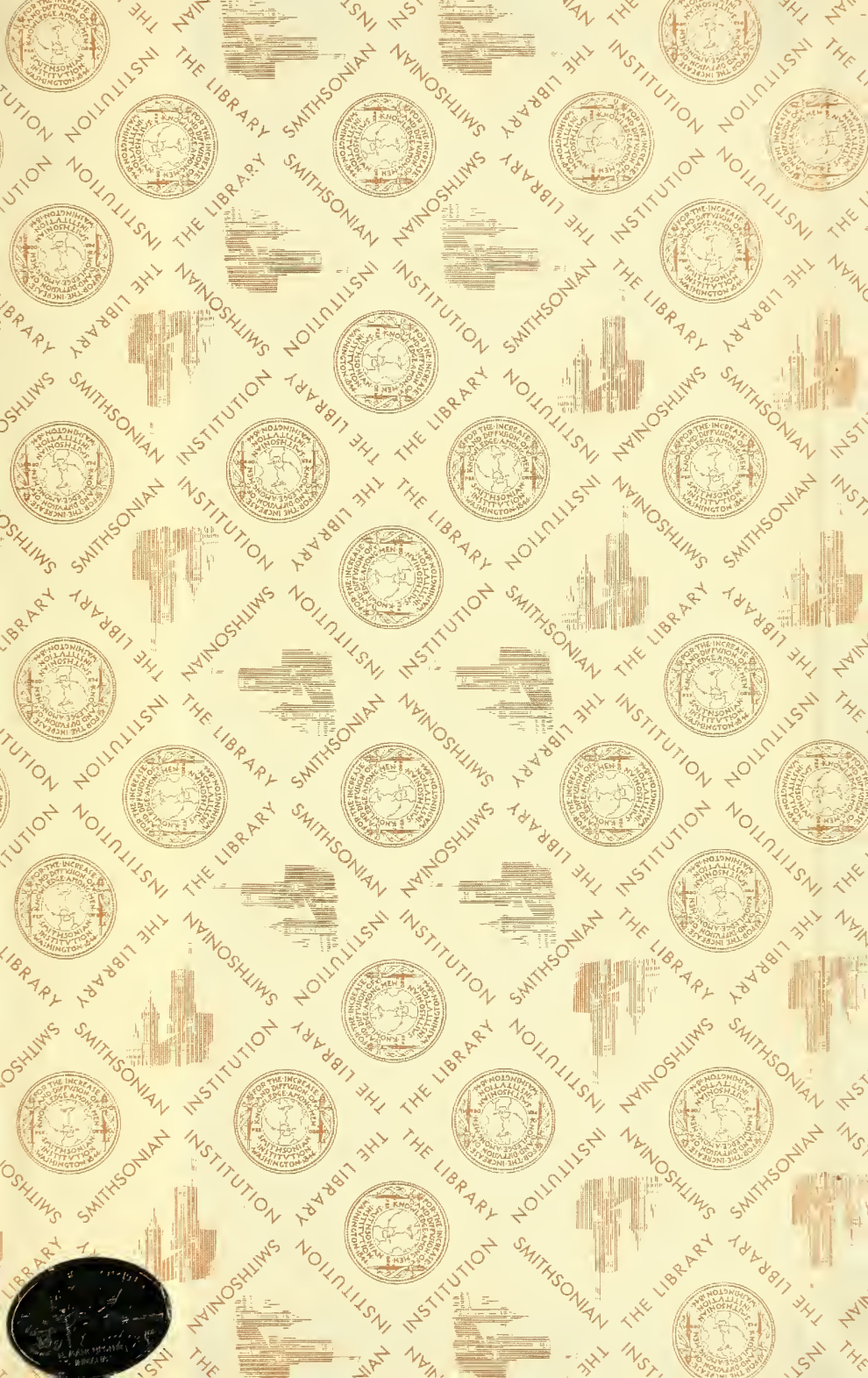
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